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ON STATE ROUTE 80 IN CONNECTICUT

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The reports of research published in this magazine are necessarily qualified by the conditions of the tests from which the data are obtained. Whenever it is deemed possible to do so, generalizations are drawn from the results of the tests; and, unless this is done, the conclusions formulated must be considered as specifically pertinent only to described conditions.

In This Issue

	Page
A Study of Motor-Vehicle Drivers and Speed in Connecticut - - - - -	89

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A STUDY OF MOTOR-VEHICLE DRIVERS AND SPEED IN CONNECTICUT¹

By HARRY R. DeSILVA, Research Associate in Psychology, Driver Research Center, Institute of Human Relations, Yale University

FACTUAL DATA regarding the influence of speed on highway accidents are very scarce, although a great deal has been said and written about speed as a cause of accidents. Before this problem can be solved, it is necessary to find out who the speeding drivers are, how many there are, and when and where they drive. This can only be accomplished by coordinating the speeds of vehicles using the highways with certain facts regarding the individual drivers.

The first of a series of investigations to throw some light on speed as related to the characteristics of individual drivers, was conducted in Connecticut during the summer of 1939 by the Driver Research Center at Yale University, in cooperation with the American Association of Motor Vehicle Administrators, the United States Public Roads Administration, and the Connecticut Motor Vehicle, State Police, and Highway Departments. This study was the first serious attempt to gather facts about the characteristics of operators whose driving speeds were accurately measured. Being the first study of its kind, it is somewhat fragmentary; but in spite of its incompleteness it is offered as a pattern that can be altered or amplified in future studies.

The findings of this investigation, which involved a comparatively small number of drivers, must be considered as tentative until corroborated by studies in other States. A driver-speed investigation has recently been completed in South Carolina and similar studies are now under way in other States.

A survey was first made of various main roads in the vicinity of Hartford, Connecticut, to select tangent sections of highway relatively free from physical hazards that might influence vehicle speeds. A description of each of the selected locations is contained in table 1. All observations were made on weekdays between the hours of 10 a. m. and 4:30 p. m. The weather was clear and warm and the visibility excellent except during the studies at station 9 where there were intermittent showers.

Vehicle speeds were obtained with a speedmeter of the recording type described and illustrated in the

April 1940 issue of PUBLIC ROADS. Efforts were made to conceal the truck housing the speedmeter so that it could not be seen by passing motorists. Two black rubber tubes, stretched across the road 24 feet apart, were used as detectors for the speedmeter. Very few drivers were aware of their presence either at a distance or when passing over them as they resembled expansion joints. Two men near the edge of the road but out of sight of oncoming cars read the registration numbers of all vehicles traveling in one direction and recorded them together with the vehicle speeds.

About a mile down the road and out of sight of the speedmeter location all vehicles traveling in this direction were stopped by a policeman who motioned them over to the side of the road where the drivers were questioned by an investigator. As about 2 minutes were required to question each driver, several men were used for this operation to prevent the formation of long lines during the hours of heaviest traffic. The questionnaire used is shown in figure 1.

At the end of the day the registration numbers on the questionnaires were matched with the registration numbers and speeds obtained at the speedmeter location. When there was any doubt about matching the registration numbers the questionnaire concerned was discarded. Two thousand six hundred and sixty-four questionnaires were identified and found to be complete enough for use in practically all of the subsequent analyses.

Upon completion of the field work, the information on the questionnaires was placed on punch cards and tabulated.²

OUT-OF-STATE DRIVERS TRAVELED FASTER THAN CONNECTICUT DRIVERS

The number of drivers studied at each location, their average speed, and number of miles traveled on the day interviewed are shown in table 2. The drivers of 74 light commercial vehicles were also interviewed but in this table, as in all other tables, they are excluded unless a separate classification is made for them. No data were collected for large trucks and busses.

TABLE 1.—Description of study locations

Station	Date 1939	Day of week	Location	Direction of traffic studied	Type of highway				Posted speed limit
					Surface type	Number of lanes	Width	Shoulders	
1	Aug. 8	Tuesday	U. S. Route 6A, 3 miles west of New Britain traffic circle.	West-bound	New concrete	2	20	5 feet oiled	M. p. h. (1)
2	Aug. 9	Wednesday	do	East-bound	do	2	20	do	(1)
3	Aug. 10	Thursday	do	West-bound	do	2	20	do	(1)
4	Aug. 15	Tuesday	State Route 10, 3 miles north of Cheshire	North-bound	Concrete	2	22	do	(1)
5	Aug. 16	Wednesday	State Route 10, 5 miles south of Cheshire	South-bound	Uneven asphalt	3	20	Extra wide	(1)
6	Aug. 17	Thursday	U. S. Route 6A, 3 miles west of New Britain traffic circle.	East-bound	New concrete	2	20	5 feet oiled	(1)
7	Aug. 23	Wednesday	State Route 15, 1 mile south of Vernon Center ²	South-bound	Concrete	2	20	do	40
8	Aug. 24	Thursday	State Route 15, 1 mile south of Vernon Center	do	do	2	20	do	40
9	Aug. 25	Friday	State Route 2, 2 miles south of East Glastonbury.	do	Concrete (wet)	2	20	do	40

¹ Not posted; 50 miles per hour permissible.
² Down 3 percent grade.

¹ Financed by a grant to Yale University from the Esso Safety Foundation.
² The Aetna Casualty and Surety Company generously helped in tabulating the data.

TABLE 2.—Average speeds and total trip distances of vehicles observed at various study locations

Station	Drivers interviewed				Average speed				Total average trip today			
	Men		Women		Men		Women		Men		Women	
	Connecticut	Out-of-State	Connecticut	Out-of-State	Connecticut	Out-of-State	Connecticut	Out-of-State	Connecticut	Out-of-State	Connecticut	Out-of-State
	Number	Number	Number	Number	M. p. h.	M. p. h.	M. p. h.	M. p. h.	Miles	Miles	Miles	Miles
1	103	66	28	9	41.3	43.6	39.8	42.9	92	240	58	265
2	101	63	31	16	43.9	46.8	44.2	44.6	96	231	74	199
3	133	52	32	11	41.2	43.9	39.3	40.8	99	231	87	219
4	176	71	29	7	41.2	43.1	39.8	42.3	118	193	80	217
5	151	31	31	6	39.7	40.5	39.9	40.4	88	167	75	162
6	243	149	47	30	44.7	46.3	43.3	43.9	116	240	92	263
7	95	204	24	48	44.5	47.2	41.1	47.5	160	291	113	271
8	104	290	23	74	46.2	46.2	41.2	45.2	140	280	135	296
9	73	23	12	4	47.3	48.4	49.2	40.6	118	160	94	193
Total	1,179	949	257	205	42.7	45.8	41.6	44.8	113	254	88	264
Combined	2,128		462		44.1		43.1		176		166	

R. _____
 S. _____
 N. _____

TRAFFIC SURVEY

Driver please check in the appropriate place:

1. Sex: Male _____ Female _____
2. Single _____ Married _____
3. Private driver _____ Commercial driver _____
4. Rural resident (less than 1000 population) _____
 City resident (more than 1000 population) _____
5. Traveling on business _____ for pleasure _____
6. Are you owner of car _____, relative _____
(Indicate relationship: son, daughter, nephew, etc.)
 or friend _____ or employee of owner _____

Fill in blank spaces:

7. Age _____ Occupation _____ Where born _____
8. How many years have you driven a car _____
 How many miles do you drive yearly _____
9. Driver's license from what state _____
10. Miles already traveled today _____
 How many miles to go today _____
11. Number of occupants besides yourself; wife or husband _____
 children _____, relatives _____, no relation _____
 Total number of occupants besides yourself _____
12. Make of car _____ Year of model _____
 Passenger car _____ Truck _____ Bus _____

FIGURE 1.—QUESTIONNAIRE FORM FILLED OUT IN SPEED STUDY.

Women drivers comprised 17.9 percent of both the Connecticut and out-of-State drivers interviewed. As women comprise 19.1 percent of all drivers registered in Connecticut, the sample of drivers obtained during the study was fairly typical in regard to the proportion of men to women drivers. Out-of-State drivers comprised 44.5 percent of the total sample. This large proportion of out-of-State drivers is not typical of traffic on all Connecticut highways and was no doubt caused by conducting the studies during hours when most Connecticut drivers are at work, during August when there is a relatively high percentage of tourist traffic, and on through routes carrying a relatively high percentage of out-of-State traffic. For this reason the data in most tables presented are generally segregated by Connecticut and out-of-State drivers.

At all stations, out-of-State men drove faster than Connecticut men and at all but station 9, where a small

sample was obtained, out-of-State women drove faster than Connecticut women, the average difference being 3.1 miles per hour for men and 3.2 miles per hour for women.

Women drivers, both Connecticut and out-of-State, drove at practically the same average speed or at a lower speed than the men at all locations except station 9 where the women Connecticut drivers traveled 1.9 miles per hour faster than the men.

The average trip length for out-of-State drivers was much longer than that for Connecticut drivers. The average trip length was practically the same for out-of-State men and women but considerably shorter for Connecticut women than for Connecticut men.

The average speed for men drivers at the different stations ranged from 39.7 miles per hour at station 5, to 48.4 miles per hour at station 9. The high speeds at station 9 may be explained by the large number of drivers in a hurry to get to shore resorts Friday afternoon ahead of an oncoming storm. Under these conditions, the Connecticut women drove faster than the men.

The uneven road surface was probably a factor causing the low average speeds at station 5, but the low average trip distance and the low percentage of out-of-State drivers probably had a greater effect.

Knowledge of the speed distribution of vehicles is necessary for the proper design of highways. Likewise, information about drivers in various speed groups is of fundamental importance for proper licensing and regulation of drivers using the highways. Average values for a number of characteristics of drivers traveling in each 5-mile-per-hour speed group are shown in table 3.

A comparison between the speed distributions found in this study and in a 1933-34 speed study in Connecticut shows that the percentage of drivers in the speed groups between 40 and 50 miles per hour has increased. In the present study the percentage of drivers traveling less than 40 miles per hour was only half as large, and the percentage traveling more than 55 miles per hour about three quarters as large as in the 1933-34 study.

The highest percentage of both men and women drivers is found in the 40 through 44 mile-per-hour group, as shown in figure 2. The average age of both men and women drivers increases from the low-speed groups up to the 30-34 mile-per-hour group and begins to decrease as the 45-49 speed group is reached. The average age of drivers in the high- and low-speed groups is lower than in the middle speed group. The increase

in age for the 70-mile-per-hour group may be attributed to the smallness of the sample. Women drivers as a group were 3 years younger than the men.

TABLE 3.—Average characteristics of drivers in various speed groups

Speed group, m. p. h.	Drivers included in study						Drivers included in study in 1933-34 ¹	Driver's age		Driving experience	
	Men		Women		Total			Men	Women	Men	Women
	No.	Pct.	No.	Pct.	No.	Pct.		Years	Years	Years	Years
Below 19.....	2	0.1	0	0	2	0.1	0.2	36.0	15.0		
20-24.....	11	0.5	4	0.9	15	0.6	1.9	39.7	34.0	17.0	13.2
25-29.....	60	2.8	14	3.0	74	2.8	7.2	37.7	36.5	15.1	9.0
30-34.....	166	7.8	41	8.9	207	8.0	16.9	41.2	36.2	16.2	9.5
35-39.....	269	12.6	65	14.1	334	12.9	21.5	40.4	36.7	16.5	10.0
40-44.....	685	32.3	168	36.4	853	32.9	25.5	40.1	37.2	16.8	11.9
45-49.....	558	26.2	112	24.2	670	25.9	13.6	38.9	36.9	16.6	12.8
50-54.....	291	13.7	45	9.7	336	13.0	8.3	37.5	34.2	16.0	11.4
55-59.....	62	2.9	11	2.4	73	2.8	3.3	36.1	32.3	16.2	14.8
60-64.....	13	0.6	2	0.4	15	0.6	1.3	29.2	34.0	11.5	12.5
65-69.....	4	0.2	0	0	4	0.1	0.1	34.5	15.2		
70 and over	7	0.3	0	0	7	0.3	0.1	39.1	14.9		
Total.....	2,128	100.0	462	100.0	2,590	100.0		39.3	36.6	16.4	11.6

Speed group, m. p. h.	Annual travel		Other occupants		Trip length today		Price classification of vehicles driven by men				Age of vehicles driven by men
	Men	Women	Men	Women	Men	Women	Low	Medium	High	Other ²	
Below 19.....	15,000	15,000	2.0	2.0	46	46	2	0	0	0	0
20-24.....	19,900	17,000	0.5	1.8	84	96	7	3	1	0	4.2
25-29.....	17,400	8,800	1.1	1.1	107	74	42	11	5	2	
30-34.....	18,200	8,400	1.1	1.3	122	95	97	43	9	17	3.3
35-39.....	16,800	7,900	1.2	1.7	145	123	180	55	19	15	
40-44.....	19,500	10,100	1.2	1.7	167	157	440	163	51	31	2.4
45-49.....	18,800	10,600	1.2	1.5	202	230	342	154	46	16	
50-54.....	18,700	11,100	1.2	1.3	218	184	173	79	35	4	1.8
55-59.....	20,700	8,400	1.1	2.1	180	258	30	20	11	1	
60-64.....	28,700	12,000	1.2	0	253	77	8	3	2	0	1.2
65-69.....	11,500	-----	1.8	-----	194	-----	3	1	0	0	
70 and over	20,700	-----	1.3	-----	179	-----	4	2	1	0	
Total.....	18,800	9,900	1.2	1.6	176	166	1,328	534	180	86	2.5

¹ Motor Vehicle Speeds on Connecticut Highway, by C. J. Tilden, D. L. Morris, T. M. C. Martin, and E. W. Russell. Yale University, Committee on Transportation, 1936. (Included 73,171 vehicles.)
² Not classified.

Even more interesting is the fact that women as a group averaged about 5 years less driving experience, and performed only about half the annual travel, of men. This fact bears out the common assumption that the average woman driver is not as experienced a driver as the average man.

Neither the annual travel nor the years of driving experience show a clear-cut trend for the different speed groups. The speed group into which drivers with high or low annual travel or driving experience fall seems to be a matter of chance. The average annual travel, especially for men, is exceedingly high when compared to the average annual travel of 8,870 miles obtained for vehicle owners in 17 States through the highway planning surveys, and the average of 12,090 miles for men drivers in Connecticut as obtained by a Connecticut Motor Vehicle Department questionnaire in 1939. The reason for the higher mileage is that in this study a sample of the more active drivers who use the road during the daytime of weekdays was obtained rather than a representative sample of all drivers. A sample

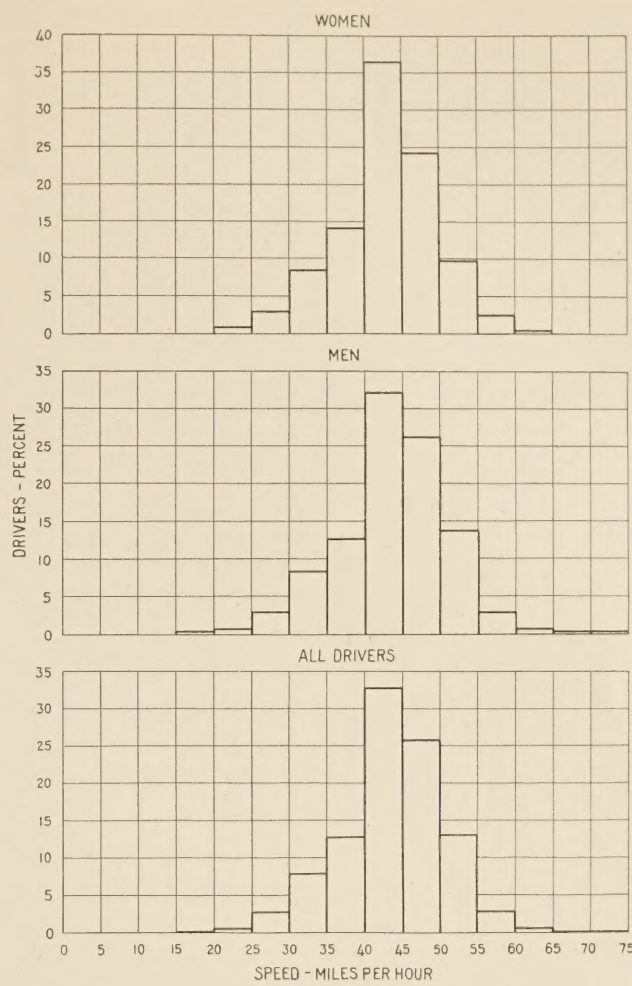


FIGURE 2.—FREQUENCY DISTRIBUTION OF SPEEDS.

of all drivers would include a larger percentage of nonowners who drive only when someone lends them a car and also a larger percentage of owners whose annual travel is relatively small.

Cars driven by women had more occupants than those driven by men. An important factor in explaining this is that over half of the women were housewives, many of whom were accompanied by their children. The high- and low-speed groups of vehicles had about the same number of occupants as the average vehicle.

DRIVERS HAVING HIGH ANNUAL TRAVEL AND NEW CARS PREDOMINATE IN HIGH-SPEED GROUP

The "trip length today" shows a fairly definite tendency to increase as the speed increases, as shown in figure 3. In other words, the farther drivers intend to go, the faster they drive. This finding is amplified later in the report.

There is a very slight tendency for drivers of high-priced cars to travel faster than the drivers of low-priced vehicles. Low-priced vehicles as a group averaged 43.9 miles per hour, medium-priced vehicles, 44.7 miles per hour, and the high-priced vehicles 45.9 miles per hour. All three price groups are well represented in all speed groups but 11.2 percent of the low-priced vehicles, 10.7 percent of the medium-priced vehicles, and 8.3 percent of the high-priced vehicles were traveling less than 35 miles per hour. The percentages traveling over 50 miles per hour were 16.4, 19.7, and 27.2 for the low-,

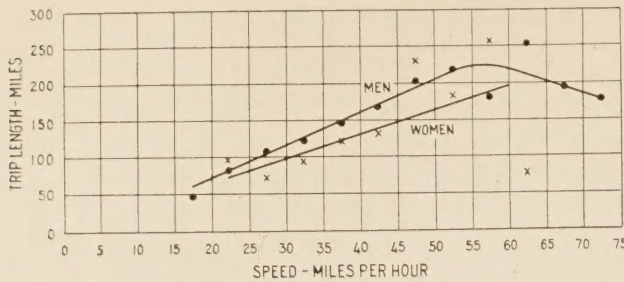


FIGURE 3.—AVERAGE TRIP LENGTH FOR DRIVERS TRAVELING AT VARIOUS SPEEDS.

medium-, and high-priced groups, respectively. A distribution of the different classes of vehicle by sex and residence of driver indicates that women, especially Connecticut women, drive a proportionately greater share of the low-priced vehicles.

The average age of vehicle was found to vary inversely with vehicle speed (fig. 4). In other words, older cars predominate in the low-speed groups and newer cars predominate in the high-speed groups. The most obvious reason for this relationship is that the new cars will actually go faster, ride more smoothly and silently, handle better, and are generally in a better mechanical condition.

Table 4 shows characteristics of the individual drivers traveling faster than 60 miles per hour. Women comprised 17.8 percent of all drivers studied, but only 2 of the high-speed drivers (7.7 percent) were women.

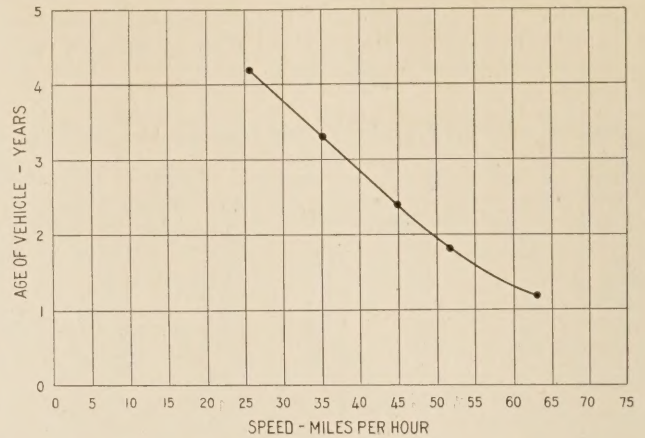


FIGURE 4.—AVERAGE AGE OF VEHICLES TRAVELING AT VARIOUS SPEEDS (INCLUDES ONLY VEHICLES DRIVEN BY MEN).

The men traveling over 60 miles per hour included practically all groups into which the drivers could be classified. Married and single men, owners and non-owners, Connecticut and out-of-State drivers, and men on business and pleasure trips, as well as a variety of occupational groups are included. The majority were traveling considerable distances during the day, although a few were going short distances. Over one-third of the drivers traveling faster than 60 miles per hour were alone, and one-fourth of them were accompanied by only one passenger. Models of cars driven

TABLE 4.—Characteristics of individual high-speed drivers
MEN TRAVELING OVER 70 MILES PER HOUR

Study station	Registration	Marital status	Residence	Purpose of trip	Relation to owner	Age of driver	Driving experience	Annual travel	Trip length today		Other occupants		Car driven	
									Travelled	Going	Number	Relation	Price	Year
8	Connecticut	Married	Urban	Business	Employee	39	19	25,000	200	212	0		High	1937
4	do	do	do	Pleasure	Owner	48	17	10,000	18	10	0		Medium	1939
6	do	do	Rural	Business	do	36	15	10,000	40	200	1		Low	1936
1	do	do	do	Pleasure	do	60	22	10,000	35	25	2	Wife and relative.	Medium	1939
3	Massachusetts	do	Urban	do	do	28	5	35,000	120	20	5	Relatives	Low	1939
3	do	Single	do	do	Friend	22	6	5,000	125	70	1	Friend	do	1939
8	New York	Married	do	Business	Owner	41	20	50,000	50	125	0		do	1939

MEN TRAVELING 65 TO 69 MILES PER HOUR

9	Connecticut	Single	Urban	Pleasure	Son	18	2	12,000	15	75	0		Low	1939
4	do	do	do	do	Owner	31	12	12,000	50	80	1		do	1936
8	Massachusetts	Married	do	do	Employee	48	25	10,000	100	230	3		do	1935
2	do	do	Rural	do	Owner	41	22	12,000	127	100	3	Friends and relatives.	Medium	1939

MEN TRAVELING 60 TO 64 MILES PER HOUR

6	Connecticut	Married	Urban	Business	Employee	27	11	40,000	70	103	0		Low	1939
6	do	do	do	Pleasure	Son	23	3	6,000	150	225	3	Relatives	do	1939
6	do	do	do	Business	Owner	46	29	30,000	40	60	1	Wife	High	1939
8	do	do	Rural	do	do	39	16	75,000	18	200	0		do	1939
9	do	Single	Urban	Pleasure	do	22	2	25,000	100	150	2		Low	1939
7	do	do	do	Business	do	24	10	40,000	200	150	0		Medium	1939
6	do	do	do	do	Son	18	2	5,000	15	40	2		Low	1939
8	Massachusetts	Married	do	do	Owner	26	10	20,000	95	230	0		do	1938
8	do	do	do	do	do	30	13	45,000	40	130	1		Medium	1939
7	do	do	do	Pleasure	Son	29	13	25,000	211	120	4	Wife and relatives.	Low	1939
7	do	Single	do	Social	Owner	26	8	12,000	100	150	2		do	1937
2	New York	do	do	Pleasure	do	37	20	25,000	100	200	0		Medium	1939
8	Pennsylvania	Married	do	Pleasure	do	32	12	25,000	272	120	1		Low	1938

WOMEN TRAVELING 60 TO 64 MILES PER HOUR

5	Massachusetts	Single	Urban	Pleasure	Owner	38	15	12,000	25	90	0		Low	1936
4	Connecticut	Married	do	do	Daughter	32	10	12,000	20	20	0		Medium	1937

by the high-speed drivers ranged all the way from 1935 low-priced to new high-priced cars.

Outstanding characteristics of the high-speed drivers as a whole are that drivers with new cars, and drivers having an annual travel over 25,000 miles comprised far more than their proportionate share. This is clearly shown by table 5. Single men, nonowners, pleasure drivers, drivers on trips of over 100 miles, and drivers below 30 years of age also comprised a considerably larger portion of the high-speed drivers than of the total sample.

TABLE 5.—Comparison of characteristics of men drivers in high-speed group with characteristics of all men drivers studied

Classification	Percentage of high-speed men drivers	Percentage of total men drivers in study
Out-of-State.....	45.8	44.6
Urban.....	83.3	81.5
Unmarried.....	33.3	25.0
Nonowners.....	33.3	27.4
Pleasure trip.....	54.2	47.5
Annual travel over 25,000 miles.....	50.0	22.0
On trip over 100 miles.....	79.2	67.5
Driving 1938 and 1939 cars.....	79.2	31.5
Driving high-priced cars.....	12.5	8.5
Two or more passengers.....	37.5	30.5
Age group:		
16-19.....	8.3	2.7
20-29.....	37.5	29.7
Driving experience, years:		
4 or less.....	16.7	9.1
5-9.....	12.5	12.0
10-19.....	45.8	37.3

Table 6 shows data relating to the characteristics of drivers in each age group. In all age groups except those over 60, in which a very limited sample was obtained, men drove slightly faster than women. Commercial drivers, including only those driving light vehicles, traveled at speeds considerably lower than either the men or women drivers of noncommercial vehicles.

TABLE 6.—Characteristics of drivers by age groups

Age of driver, years	Drivers included in study			Speed											Owners	
	Men	Women	Com-mercial	Men					Women					Com-mercial	Men	Women
				Single	Married	Owners	Non-owners	Total	Single	Married	Owners	Non-owners	Total			
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>M.p.h.</i>	<i>M.p.h.</i>	<i>M.p.h.</i>	<i>M.p.h.</i>	<i>M.p.h.</i>	<i>M.p.h.</i>	<i>M.p.h.</i>	<i>M.p.h.</i>	<i>M.p.h.</i>	<i>M.p.h.</i>	<i>M.p.h.</i>	<i>Percent</i>	<i>Percent</i>
16-19.....	57	10	5	45.1	44.1	41.0	45.3	45.1	39.8	44.1	58.4	37.7	39.8	40.1	10.5	10.0
20-29.....	441	116	28	44.7	44.1	44.1	45.3	44.5	43.1	44.1	44.3	42.7	43.4	40.2	59.6	43.1
30-39.....	618	169	21	45.4	44.5	44.7	44.9	44.7	43.0	43.1	42.7	43.6	43.1	39.8	74.9	55.3
40-49.....	597	105	10	43.3	44.0	43.7	44.5	43.9	43.9	42.6	43.5	42.4	43.1	34.7	79.3	67.3
50-59.....	269	50	6	43.1	43.1	43.4	41.9	43.1	41.7	43.2	42.3	43.3	42.6	37.4	81.4	81.6
60-69.....	124	10	4	42.8	42.3	43.0	40.0	42.4	40.4	40.6	42.4	42.4	42.4	34.6	81.4	100.0
Over 70.....	22	2	0			42.1	40.9	42.0			44.2	46.4	45.3	42.3	42.3	45.3
Total.....	2,128	462	74	44.6	43.9	43.9	44.5	44.1	42.9	43.1	42.9	42.8	42.9	38.8	72.6	57.7

Men in the 16-19 year age group had a slightly higher average speed than drivers in the 20-29 year age group. Beyond the age of 40 there was a definite drop in average driving speed with increasing age, for men drivers. The younger single men traveled at slightly higher speeds than the younger married men. Beyond 40, married men traveled as fast as single men. The differences are, however, very small and figures on larger numbers must be obtained before much importance can be attached to this finding.

Interesting information is presented in table 6 for each age group regarding the driving speeds of owners and nonowners, and the percentage of drivers in each group that owned the cars they were driving. A separate breakdown of the 20-29 age group is shown for these factors in table 7.

TABLE 7.—Characteristics of young drivers

Age of driver, years	Drivers included in study		Speed						Owners	
	Men	Women	Men			Women			Men	Women
			Owners	Nonowners	Total	Owners	Nonowners	Total		
	No.	No.	<i>M.p.h.</i>	<i>M.p.h.</i>	<i>M.p.h.</i>	<i>M.p.h.</i>	<i>M.p.h.</i>	<i>M.p.h.</i>	<i>Pct.</i>	<i>Pct.</i>
20.....	34	5	42.3	43.9	43.6	51.8	47.3	48.2	17.6	20.0
21.....	25	10	42.6	43.4	43.1	46.9	44.9	46.1	32.0	60.0
22.....	58	8	43.1	47.8	45.5	-----	45.8	45.8	50.0	0
23.....	42	15	44.3	45.1	44.6	43.0	41.0	41.7	64.2	33.3
24.....	51	12	43.3	47.5	44.7	41.7	42.3	42.0	66.6	58.3
25-29.....	231	66	44.5	44.8	44.6	44.3	41.8	43.0	68.8	46.9

MEN HAD MORE DRIVING EXPERIENCE THAN WOMEN

As would be expected, the data show that for the sample obtained during this study very few of the men under 20 years of age were owners of the cars they were driving (see fig. 5). The percentage of owner drivers

Age of driver, years	Other occu-pants		Trip length today		Driving ex-perience		Annual travel					Distribution of men drivers				
	Men	Women	Men	Women	Men	Women	Men			Women	All men in Con-necticut ¹	Age of vehicles driven by men	Studied			Regis-tered in Con-necticut
							Con-necticut	Out-of-State	Total				Con-necticut	Out-of-State	Total	
	<i>Number</i>	<i>Number</i>	<i>Miles</i>	<i>Miles</i>	<i>Years</i>	<i>Years</i>	<i>Miles</i>	<i>Miles</i>	<i>Miles</i>	<i>Miles</i>	<i>Years</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	
16-19.....	1.6	1.7	159.4	118.6	2.0	1.9	8,300	10,100	8,900	6,700	9,900	3.0	3.1	2.1	2.7	4.8
20-29.....	1.2	1.5	165.0	162.7	7.6	6.5	20,100	16,900	18,852	8,952	15,300	3.0	22.8	18.1	20.7	29.6
30-39.....	1.1	1.8	185.0	160.3	15.4	12.1	21,500	19,900	20,680	10,220	13,100	2.4	27.5	31.0	29.0	26.9
40-49.....	1.2	1.6	182.0	176.1	20.5	14.1	19,200	19,400	19,234	10,706	12,000	2.2	27.0	29.4	28.1	21.1
50-59.....	1.1	1.1	164.9	178.5	22.8	15.7	18,500	17,700	18,081	8,570	10,400	2.5	19.6	19.4	19.5	17.6
60-69.....	1.2	1.0	172.5	149.9	24.9	21.0	14,100	13,500	{ 14,452	10,100	{ 6,800	{ 2.7				
Over 70.....	1.2	1.0	171.4	275.0	23.9	28.5							9,700	6,100	{ 4.2	
Total.....	1.2	1.6	175.9	165.8	16.4	11.6	19,200	18,200	18,800	9,900	12,086	2.5	100.0	100.0	100.0	100.0

¹ As obtained by Connecticut Motor Vehicle Department questionnaire in 1939.
² Average annual travel from highway planning surveys in 17 states was 8,870 miles in 1936.

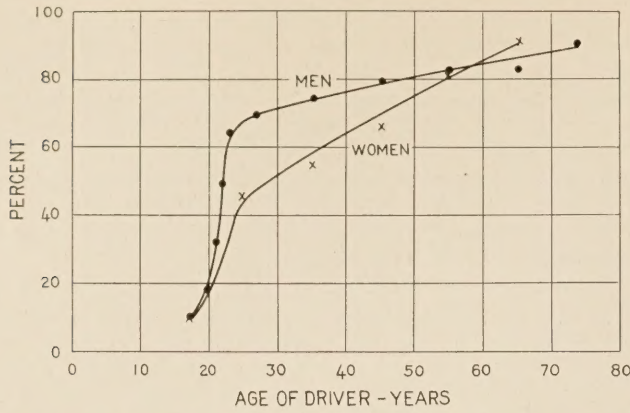


FIGURE 5.—PERCENTAGE OF DRIVERS THAT OWNED THE VEHICLES BEING DRIVEN.

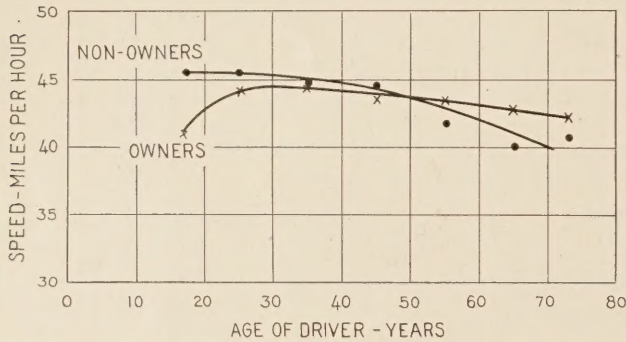


FIGURE 6.—COMPARISON OF AVERAGE SPEED WITH AGE OF DRIVER FOR MEN WHO DID AND MEN WHO DID NOT OWN THE VEHICLES BEING DRIVEN.

increased rapidly from 17.6 percent at the age of 20, to 50 percent at the age of 22. Above 22 years of age, the percentage of owners increased gradually until at 70 nearly all men driving cars were owners.

The average speeds for men below 25 years of age who owned the cars they were driving were slightly lower than the average speeds for men of the same age who were nonowner drivers (see fig. 6).

The average annual travel for owners and nonowners was practically the same, but nonowners drove newer cars. The average age of the vehicles driven by nonowners was 2.32 years as compared to 2.61 years for vehicles owned by the drivers.

Table 8 indicates that the heaviest concentration of Connecticut nonowner drivers was in the 20-29 age group. Beyond the age of 30 the percentage of owner drivers is greater than nonowners. In the case of out-of-State drivers the percentage of owners was larger up to the age of 50, after which nonowners predominated. The proportion of owners among out-of-State operators reached 76.8 percent as compared to only 69.3 percent of owners among Connecticut motorists.

The number of women drivers studied was very small, so the results are probably influenced by chance to such an extent that the figures cannot be relied upon. However, the data shown by table 6 indicate that the small number of women in the 16-19 age group did not drive as fast as women in the other groups. There is practically no difference in the average speeds for owners, nonowners, single, or married women. Except for the exceedingly small group above 70 years old, the percentage of owners increased as the age increased.

There was no clear-cut relationship between the

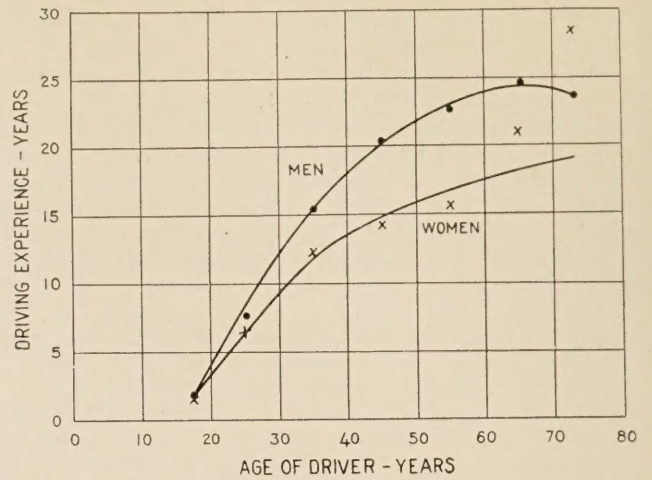


FIGURE 7.—DRIVING EXPERIENCE FOR DRIVERS OF VARIOUS AGES.

number of occupants and the age of the driver. Men under 20 years of age and women under 50 had the greatest average number of occupants, but whether this is typical can only be determined by further investigation.

The average trip length for young people was slightly lower than for other groups but there was no uniform trend.

TABLE 8.—Distribution of Connecticut and out-of-State men drivers by age and vehicle ownership

Age, years	Connecticut		Out-of-State	
	Owners	Nonowners	Owners	Nonowners
16-19	0.5	9.1	0.3	0
20-29	18.8	31.9	14.8	8.2
30-39	28.5	25.2	31.9	28.6
40-49	30.6	18.8	30.6	28.7
50-59	13.8	10.2	14.6	25.0
60-69	6.7	4.2	6.3	5.9
70 and over	1.1	.6	1.5	3.6
Total	100.0	100.0	100.0	100.0

The years of driving experience for men varied almost directly with the age of the driver up to about age 40 after which the years of experience ceased to advance materially with increased age (fig. 7). Young women up to the age of 25 had approximately the same length of driving experience as young men, but beyond 25 the average man had driven a car for more years than the average woman.

The annual travel for men less than 20 years old was much lower than for other age groups. Above 20, there was an increase up to the 30-39 age group and then a gradual decline with an increase in age. This was true for both Connecticut and out-of-State drivers. One reason why the 30-39 age group had the highest annual travel is probably the high percentage of salesmen drivers (30 percent) included in the study. Corresponding figures for all Connecticut men as obtained from the Connecticut Motor Vehicle Department questionnaire in 1939 do not indicate as great a variation for the different age groups and the average annual travel for all age groups was much lower. There was practically no relationship between the annual travel by women and their age although the young and old women drove fewer miles than women in the intermediate age groups.

The average age of the vehicles driven by men in the 40-50 age group was 2.2 years, which is lower than for any other age group. The average age of vehicle driven by the youngest drivers was 3 years, and 4.2 years for the drivers over 70. Although the average age of cars driven by elderly people was high, table 9 shows that they nevertheless drove a small percentage of the total number of old cars on the highway. Men in the 30-39 year group drove 27.8 percent of all cars over 10 years old. None of the drivers under 20 drove cars older than 10 years.

TABLE 9.—Percentage of cars of various year models driven by men in various age groups

Age of driver, years	Year model of car					
	1922-29	1930-31	1932-33	1934-35	1936-37	1938-39
16-19	3.5	4.9	3.6	3.5	2.5	2.5
20-29	13.9	32.9	36.6	25.0	22.2	18.5
30-39	27.8	25.9	23.2	26.2	26.2	30.3
40-49	19.4	21.2	19.5	22.6	26.9	32.0
50-59	19.5	8.3	12.2	17.3	13.7	10.3
60-69	11.1	8.2	3.6	4.1	6.5	5.7
70 and over	8.3			1.2	1.0	.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

The data show that there were more middle-aged drivers among the active drivers on the road than among the Connecticut driving population as a whole. The younger drivers constituted a smaller percentage of the sample than they do of all licensed drivers in the State. Samples taken during the evening hours and over the week ends would undoubtedly show a larger percentage of young drivers on the highway. There was a larger percentage of younger persons among the Connecticut drivers than among the out-of-State drivers for both men and women, but the difference was slight.

In table 10, drivers are grouped by length of driving experience. For men, length of driving experience seemed to play no part in determining the speeds at which motor vehicles were driven. For women, the average driving speeds increased as the length of driving experience increased.

TABLE 10.—Average speed and age of drivers classified by length of driving experience

Driving experience, years	Drivers studied		Speed		Age	
	Men	Women	Men	Women	Men	Women
1-4	193	68	43.7	42.0	24.1	29.1
5-9	256	110	44.1	42.7	27.7	32.0
10-14	371	124	44.4	42.4	34.4	36.3
15-19	423	79	44.1	43.8	39.7	40.7
20-24	495	58	44.1	44.3	45.2	43.1
25-29	271	20	43.7	44.5	49.4	
30-34	86		44.5		54.1	
35 and over	30		44.2		58.2	
Total	2,125	459	44.1	42.9	39.3	36.3

Although there were no women with more than 25 years of driving experience, a considerable number of men had been driving 25 years or more. Most women operators had been driving between 5 and 14 years, whereas the majority of men had been driving between 15 and 24 years. This fact cannot be accounted for by differences in the average ages of men and women drivers since the average age of women was less than 3 years below that of men.

The following tabulation, including only data for men, shows that the mileage driven increased with an increase in experience up to the 5-9 year group. The average driver with 5-9 years of experience drove practically the same annual mileage as the average of all drivers studied.

Driving experience, years:	Annual travel, miles
1	7,300
2	9,800
3	14,300
4	16,000
5-9	18,100
Average, all drivers	18,800

TRIP DISTANCE FOUND TO AFFECT DRIVING SPEED

In table 11, the operators are grouped according to the number of miles they had already traveled when they were interviewed, and in table 12 they are grouped according to the number of miles they still intended to drive that day.

TABLE 11.—Number and average speed of drivers that had already traveled various distances on day of study

Distance already traveled, miles	Drivers studied	Speed	Distance already traveled, miles	Drivers studied	Speed
	Percent	M. p. h.		Percent	M. p. h.
0-4	1.6	38.6	40-49	6.0	42.7
5-9	4.8	41.0	50-99	21.9	44.4
10-19	12.3	42.1	100 and up	36.2	45.6
20-29	9.3	42.1			
30-39	7.9	41.7	Total	100.0	43.9

TABLE 12.—Number and average speed of drivers that had yet to travel various distances on day of study

Distance yet to travel, miles	Drivers studied	Speed	Distance yet to travel, miles	Drivers studied	Speed
	Percent	M. p. h.		Percent	M. p. h.
0-4	1.0	39.9	40-49	5.7	42.1
5-9	3.6	40.0	50-99	20.8	42.7
10-19	7.7	41.6	100 and up	44.9	45.7
20-29	9.0	42.1			
30-39	7.3	42.8	Total	100.0	43.9

There was a definite relationship between average speed and trip distance. Drivers who had traveled short distances were driving at lower speeds than drivers who had traveled long distances. Similarly, drivers who still had long distances to go were traveling much faster than drivers who were near their destination. This could not be true had the total trip length been the same for all drivers.

A group of 698 operators who had already driven over 100 miles and were going over 100 miles more that day had an average speed of 46.3 miles per hour. Another group of 119 operators who had traveled less than 20 miles and had less than 20 miles still to go that day had an average speed of only 40.4 miles per hour. The five operators who had traveled less than 5 miles and had less than 5 miles still to go that day, had an average speed of only 36 miles per hour.

In table 13 operators are grouped according to their total reported daily mileages. The relationship between trip distance and speed holds quite well for all classifications (fig. 8). There were so few out-of-State drivers in the first groups that the average speed figures should be disregarded. A higher percentage of the Connecticut men than women were going over 100 miles. Nearly all out-of-State drivers, both men and women, were going over 100 miles.

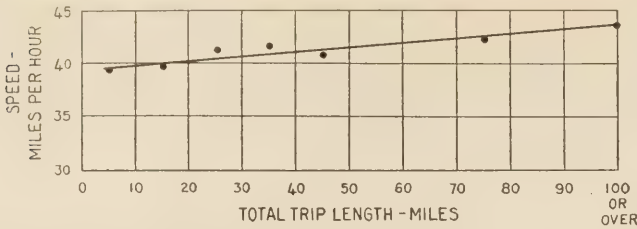


FIGURE 8.—AVERAGE SPEED FOR MEN TRAVELING VARIOUS DISTANCES ON DAY OF STUDY.

Table 13 also indicates that the sample of drivers is heavily overweighted in long distance groups, which explains the high annual mileage for the average driver. Since speed increases with an increase in trip length, the table also suggests that the average speed of the drivers in the sample was higher than the average speed would be for a more representative sample of all drivers in Connecticut.

TABLE 13.—Number and average speed of drivers traveling various total distances on day of study

Total distance today, miles	Number of drivers				Percentage of drivers				Speed			
	Connecticut		Out-of-State		Connecticut		Out-of-State		Connecticut drivers		Out-of-State Drivers	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
	Percent		Percent		M.p.h.		M.p.h.					
0-9	5	3			0.4	1.2			39.6	30.7		
10-19	24	15	4		2.0	5.8	0.4		39.7	41.2	45.6	
20-29	47	23	4		4.0	8.9	.4		41.4	39.8	43.0	
30-39	76	30		2	6.4	11.7		1.0	41.6	39.2		41.1
40-49	101	20	3	4	8.6	7.8	.3	2.0	41.0	43.3	34.2	41.7
50-99	383	91	45	8	32.5	35.4	4.8	4.0	42.5	42.0	44.9	40.2
100 and up.	543	75	892	188	46.1	29.2	94.1	93.0	43.7	42.9	45.1	45.2
Total	1,179	257	948	202	100.0	100.0	100.0	100.0	42.7	41.6	45.8	44.8

Table 14 shows the relative number and average speed of vehicles by year models. Out-of-State operators, most of whom were driving for pleasure, had newer model cars than Connecticut drivers, most of whom (especially the men) reported they are driving for business purposes (fig. 9). Thus, 82.7 percent of the out-of-State drivers had cars of 1936 model or later, as compared to only 69.7 percent of the Connecticut drivers. The Connecticut women included in the sample drove later model cars than the men, but out-of-State women drove about the same proportion of the newer cars as the out-of-State men.

A comparison between the percentage of registered vehicles in the year model group with the distribution of year models for the Connecticut drivers as obtained by the study indicates that the newer cars comprised a much larger proportion of the cars using the highway than they do of the total registration. Although 1938-39 models are only 14.5 percent of the registered vehicles, they comprised 33.9 percent of the sample. On the other extreme, vehicles of 1931 model or older comprised 27 percent of the registered vehicles but only 9.6 percent of the total sample.

Operators of late model cars, whether they were Connecticut or out-of-State drivers, traveled at higher speeds than motorists in older vehicles. It is particularly interesting to note that out-of-State operators drove both old and new cars at higher speeds than did Connecticut operators (fig. 10), indicating that the

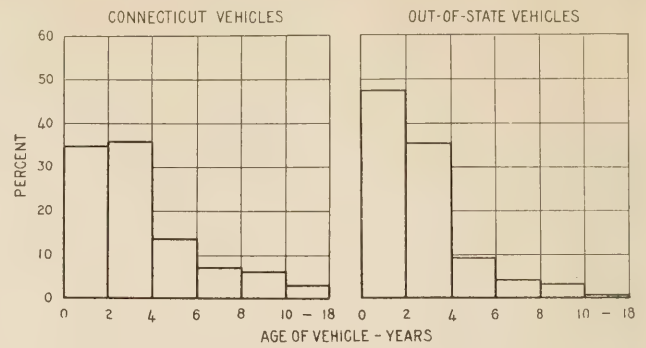


FIGURE 9.—FREQUENCY DISTRIBUTION OF VEHICLE AGES.

TABLE 14.—Relative number and average speed of vehicles by year models

Year model of vehicle	Vehicles driven by—						Vehicles registered in Connecticut	Speed	
	Connecticut drivers			Out-of-State drivers				Connecticut vehicles	Out-of-State vehicles
	Men	Women	Total	Men	Women	Total		M.p.h.	M.p.h.
	Percent	Percent	Percent	Percent	Percent	Percent		Percent	Percent
1922-29	3.1	2.3	3.0	0.7	0.5	0.7	27.0	38.7	41.2
1930-31	7.2	3.9	6.6	3.5	2.0	3.2		39.3	40.7
1932-33	7.0	7.0	7.0	3.8	5.0	4.0		12.8	39.7
1934-35	14.2	10.9	13.7	9.3	9.9	9.4	17.4	42.0	45.6
1936-37	34.0	44.4	35.8	35.2	36.1	35.3	28.3	42.9	45.7
1938-39	34.5	31.5	33.9	47.5	46.5	47.4	14.5	44.0	46.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	44.1	42.9

character of trip as well as the age of the vehicle had an effect on the speed.

Tables 15 and 16 show the number and average speed of vehicles driven by men according to the number of occupants and their relationship to the driver. Lone drivers traveled at higher speeds than drivers with passengers. However, the difference was more marked for Connecticut than for out-of-State drivers.

TABLE 15.—Number and average speed of vehicles by the number of occupants

[Includes only vehicles driven by men]

Occupants in addition to driver, number	Vehicles studied				Average speed of vehicles	
	Connecticut		Out-of-State		Connecticut	Out-of-State
	Number	Percent	Number	Percent	M. p. h.	M. p. h.
0	568	48.2	220	23.2	43.3	46.2
1	358	30.3	335	35.3	42.7	45.4
2	127	10.8	167	17.6	41.7	45.8
3	77	6.5	146	15.4	40.9	45.9
4	29	2.5	52	5.5	40.4	46.0
5	13	1.1	24	2.5	44.4	45.9
6	5	.4	5	.5	37.3	46.3
7	2	.2	0	0	41.1	
Total	1,179	100.0	949	100.0	42.7	45.8

There was a decrease in speed of Connecticut cars as the number of occupants increased to four (table 15). The data on out-of-State drivers show that the presence of passengers had little effect on speed. It is interesting to note that 1.7 percent of the Connecticut vehicles and 3 percent of the out-of-State vehicles had five or more passengers in addition to the driver.

Connecticut drivers traveling alone or with occupants that were of no relation traveled a little faster than those

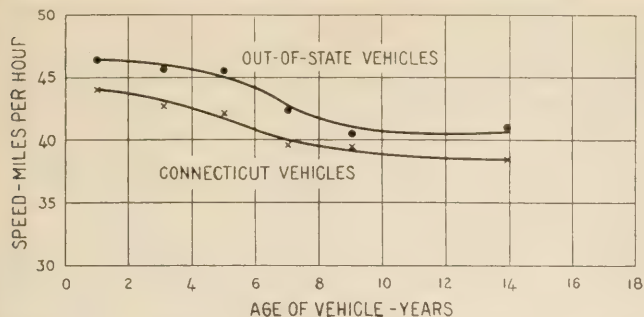


FIGURE 10.—AVERAGE SPEEDS OF VEHICLES OF VARIOUS AGES.

TABLE 16.—Number and average speed of vehicles by relationship of occupants to driver

[Including only vehicles driven by men]

Relation of occupants to driver	Vehicles studied		Average speed of vehicles	
	Connecticut	Out-of-State	Connecticut	Out-of-State
	Number	Number	M. p. h.	M. p. h.
No other occupants.....	568	220	43.3	46.2
No relation.....	241	141	43.2	46.1
Children.....	19	17	42.3	42.8
Wife.....	119	194	41.5	44.9
Wife and children.....	72	169	40.2	45.7
Wife, children, and relatives.....	10	28	36.5	46.7

with members of their family (table 16). A much greater proportion of the out-of-State drivers than Connecticut drivers were accompanied by their wives. Thus, 68.8 percent of out-of-State men had their wives with them as compared to about one-third of the Connecticut drivers. The percentage of Connecticut drivers that had no passengers was more than double the corresponding figure for out-of-State drivers. The reason probably is that a majority of Connecticut drivers (60.3 percent) were on business trips while a majority of the out-of-State drivers (64.5 percent) were on pleasure trips. (See table 18.)

VEHICLES ENTERING CITY TRAVELED FASTER THAN VEHICLES LEAVING CITY

A number of characteristics for drivers in different occupational groups are shown in table 17. Chauffeurs were the fastest drivers and truck drivers in private cars were the slowest. The speed of salesmen was about the same as the speed of the average driver. Their annual travel was about one-third higher than reported by other drivers. The average annual travel for all drivers exclusive of salesmen was 15,900 miles, whereas the average annual travel for all operators, including salesmen, was 18,800 miles. The various occupational groups among women drivers had no marked differences in average speeds.

A separate occupational classification made of non-owner drivers under 30 years of age showed that a considerable proportion of the men were either students (23 percent) or salesmen (12 percent), and that the largest groups for women were teachers (28 percent) and housewives (20 percent).

Table 18 shows data for drivers grouped according to the purpose of the trip. Drivers on business trips traveled at approximately the same speed but shorter distances than drivers on pleasure trips. This holds for both men and women, and out-of-State as well as

Connecticut drivers, although the difference in trip distance was proportionately less for the Connecticut than for the out-of-State drivers. A higher percentage of women than men were on pleasure trips. The difference was especially large for the Connecticut drivers.

TABLE 17.—Average characteristics of passenger car drivers in various occupational groups

Occupation	Drivers included in study		Speed traveled	Age of driver	Driving experience	Trip length	Annual travel	Other occupants
	Number	Percent						
Chauffeurs.....	50	2.3	45.6	39.2	19.3	212	23,200	1.6
Professional.....	310	14.7	45.0	41.0	17.1	203	15,660	1.3
Students.....	69	3.2	45.0	20.3	3.5	195	8,500	1.6
Salesmen.....	641	30.1	44.3	40.1	18.1	171	25,400	.8
Unemployed.....	32	1.5	44.2	36.0	14.0	174	15,100	1.3
Truck drivers.....	30	1.4	41.8	30.3	12.2	188	41,200	1.4
Others.....	996	46.8	43.6	39.9	16.2	167	15,400	1.4
Total.....	2,125	100.0	44.1	39.3	16.4	176	18,800	1.2

WOMEN								
Professional.....	126	27.3	43.2	36.0	11.3	188	10,500	1.3
Housewives.....	216	46.8	42.9	39.4	12.8	155	9,100	1.8
Saleswomen.....	9	1.9	42.3	38.8	10.2	120	10,400	.4
Unemployed.....	5	1.1	42.3	24.0	6.0	191	12,200	1.4
Students.....	13	2.8	41.4	23.8	4.6	140	10,000	1.7
Others.....	93	20.1	43.6	33.4	10.5	167	10,700	1.3
Total.....	462	100.0	42.9	36.6	11.6	166	9,900	1.6

TABLE 18.—Characteristics of drivers by purpose of trip

Trip purpose	Drivers included in study				Percentage distribution of drivers			
	Connecticut		Out-of-State		Connecticut		Out-of-State	
	Men	Women	Men	Women	Men	Women	Men	Women
	Number	Number	Number	Number	Percent	Percent	Percent	Percent
Business.....	711	58	294	14	60.3	22.6	31.0	6.8
Pleasure.....	400	186	611	187	33.9	72.4	64.5	91.2
Combination.....	68	13	43	4	5.8	5.0	4.5	2.0
Total.....	1,179	257	948	205	100.0	100.0	100.0	100.0

Trip purpose	Speed				Trip distance			
	Connecticut		Out-of-State		Connecticut		Out-of-State	
	Men	Women	Men	Women	Men	Women	Men	Women
	M. p. h.	M. p. h.	M. p. h.	M. p. h.	Miles	Miles	Miles	Miles
Business.....	43.1	41.9	46.0	44.4	109	82	218	231
Pleasure.....	42.3	41.6	45.7	44.9	119	88	268	266

Table 19 summarizes the characteristics of drivers in a number of different group classifications. There were no significant differences between rural and urban operators in any of the factors studied. Eighty-two percent of both the men and women were urban residents.

Foreign-born men drivers had a slightly lower average speed than native-born men drivers. This may be due to the greater age or shorter trip distance for the foreign-born operators, who also reported a lower annual travel.

There were almost as many out-of-State drivers as there were Connecticut drivers. This indicates that the sample is not typical, since only on the main through roads would there be such a high percentage of out-of-State drivers.

The average speed of out-of-State men drivers was

about 3 miles per hour faster than that of Connecticut drivers. This greater speed, however, is probably attributable to the much greater trip distance of the out-of-State drivers—254 miles as compared with 113 miles for the Connecticut drivers.

TABLE 19.—Characteristics of drivers by different group classifications

Classification of drivers	Drivers included in study		Average speed M. p. h.	Age of driver Years	Driving experience Years	Trip length Miles	Annual travel Miles	Other occupants Number
	Number	Percent						
Rural residents:								
Men.....	394	15.2	43.9	38.8	16.4	173	18,200	1.1
Women.....	83	3.2	42.5	36.0	12.2	155	9,100	1.7
Urban residents:								
Men.....	1,734	66.9	44.1	39.4	16.5	177	18,900	1.2
Women.....	379	14.7	43.2	36.8	11.4	168	10,000	1.5
Foreign-born men.....	285	13.4	43.1	44.6	16.9	163	16,200	1.3
Native-born men.....	1,843	86.6	44.2	38.5	16.4	178	19,100	1.2
Connecticut:								
Men.....	1,179	45.5	42.7	38.9	16.1	113	19,200	.9
Women.....	257	10.0	41.6	36.0	10.7	88	9,300	1.4
Out-of-State:								
Men.....	949	36.6	45.8	39.7	16.8	254	18,200	1.5
Women.....	205	7.9	44.8	37.4	12.6	264	10,600	1.7

The difference in trip distance between Connecticut women and out-of-State women was even greater—264 miles for the out-of-State women as against 88 miles for Connecticut women. From these data it appears that the chief reason why out-of-State drivers traveled faster is that they were going farther.

In table 20 drivers are grouped according to the States in which their cars were registered. The average speed ranged from 46 miles per hour for Pennsylvania and New York drivers, to about 42 miles per hour for Maryland and Illinois drivers. Although Illinois and Michigan are much farther away from Connecticut than the other States represented, their drivers did not travel as fast as drivers from other States. Since the number of Michigan, Illinois, and Maryland drivers included in the sample was small, the particular character of the drivers involved may have much more to do with the average speeds than their place of residence.

TABLE 20.—Average speed and trip distance for drivers from various States

State	Drivers studied Number	Speed traveled M. p. h.	Trip length on day of study Miles
New York.....	276	46.1	248
Massachusetts.....	315	45.9	234
New Jersey.....	111	45.4	269
Maine.....	16	45.2	288
Connecticut.....	1,179	42.7	113
Michigan.....	11	42.6	271
Illinois.....	17	42.0	287
Maryland.....	12	41.6	320

A direct comparison was made between the speed of traffic traveling toward and away from Hartford, Conn., at a location a few miles from the city (at stations 1, 2, 3, and 6). At stations 1 and 3 the speed of traffic going away from the city (out-bound) was obtained, while at stations 2 and 6, the speed of traffic going toward the city (in-bound) was obtained. Table 21 shows that in-bound traffic consistently traveled from 2 to 4 miles per hour faster than out-bound traffic, regardless of whether the drivers were men or women, or from Connecticut or some other State. Speed studies made

at the outskirts of Austin, Tex.,¹ and recent studies conducted by the Public Roads Administration in a number of States also show the same tendency for in-bound traffic to travel faster than out-bound traffic.

TABLE 21.—Comparison of speeds for out-bound and in-bound traffic

Direction of traffic	Drivers included in study				Average speed			
	Connecticut		Out-of-State		Connecticut drivers		Out-of-State drivers	
	Men	Women	Men	Women	Men	Women	Men	Women
Out-bound.....	236	60	118	20	41.2	39.5	43.7	41.8
In-bound.....	344	78	212	46	44.5	43.7	46.4	44.1

The factor of trip distance does not account for the higher speed of in-bound drivers. According to table 22 the proportion of Connecticut drivers on long trips is slightly higher for the in-bound drivers than for the out-bound drivers, but there is no significant difference among the out-of-state drivers. Table 23 shows that very few of the in-bound drivers had Hartford for their destination since all sections of Hartford fell within the 0-9 mile range.

TABLE 22.—Distribution of in-bound and out-bound drivers by total trip distance on day of study

Total trip distance, miles	Out-bound drivers		In-bound drivers	
	Connecticut	Out-of-state	Connecticut	Out-of-state
	Percent	Percent	Percent	Percent
0-9.....	0	0	0	0
10-49.....	30.2	2.9	21.1	1.9
50-99.....	34.5	2.9	36.0	6.6
100-199.....	28.5	30.4	30.3	29.1
200-299.....	4.4	37.7	9.8	30.6
300 or more.....	2.4	26.1	2.8	31.8
Total.....	100.0	100.0	100.0	100.0

TABLE 23.—Distribution of in-bound and out-bound drivers by remaining distance to go on day of study

Remaining distance, miles	Out-bound drivers		In-bound drivers	
	Connecticut	Out-of-state	Connecticut	Out-of-state
	Percent	Percent	Percent	Percent
0-9.....	9.3	1.7	4.9	1.4
10-49.....	45.8	6.8	41.0	12.7
50-99.....	28.0	25.4	29.7	13.7
100 or more.....	16.9	66.1	24.4	72.2
Total.....	100.0	100.0	100.0	100.0

The simplest explanation of the differences in speed of in-bound and out-bound traffic seems to be that after traveling at higher speeds in the open country, drivers lose their sense of speed and, therefore, do not slow down when they approach a city until congested traffic actually impedes their progress. Drivers leaving a city en route and city drivers starting a trip are still "speed conscious" and increase their pace gradually until they are well away from the congestion of the city. It seems that having attained a high speed, drivers tend to continue at the same rate until they are compelled

¹ Motor Vehicle Speeds on U. S. Highway 81 between Austin and San Marcos, Tex. The Information Exchange, May 15, 1939, No. 69, Texas Highway Department

to slow down, whereas after being restrained by a city speed limit, they build up their speed very gradually, even after getting out of the city traffic.

Undoubtedly, the effect of proximity to a city on driving speed is modified by the size of the city and amount of traffic congestion in the city. Future investigations should attempt to throw more light on these points.

HIGH-SPEED DRIVERS HAD MORE ACCIDENTS AND TRAFFIC VIOLATIONS THAN MODERATE-SPEED DRIVERS

The accident and traffic violation records of 813 Connecticut drivers, 216 New York drivers, and 95 New Jersey drivers were obtained from the Connecticut, New York, and New Jersey motor vehicle departments. Since the names of the drivers were not obtained at the time the questionnaires were filled out, only the operators owning the cars they were driving could be identified from the registration numbers.

To study the relation between the operators' open road speed and their driving records, two groups were made. The high-speed group includes all operators traveling over the maximum permitted speed of 50 miles per hour on Connecticut highways. The moderate-speed group includes all operators who were traveling from 35 to 45 miles per hour.

Table 24 shows the number of operators involved in accidents, traffic violations, and speed violations, and the relative proportion of accidents and violations incurred by high-speed versus moderate-speed motorists. The reason that Connecticut operators had high accident records is that Connecticut accident records extend farther back than those of the other two States. In New York only fatal and personal injury accidents are legally reportable, while in Connecticut and New Jersey property damage accidents in excess of \$25 must also be reported. This explains why New York residents had lower accident records than those of the other two States.

TABLE 24.—Traffic accidents, traffic violations, and speed violations for high- and intermediate-speed drivers (includes only drivers who owned the cars they were operating)

CONNECTICUT MEN							
Speed group, miles per hour	Drivers included in study	Percentage of drivers studied having—			Traffic accidents per 100 drivers	Traffic violations per 100 drivers	Speed violations per 100 drivers
		Accident record	Traffic violation record	Speed violation record			
	Number	Percent	Percent	Percent	Number	Number	Number
35-45.....	372	39.8	24.5	5.1	86.8	39.5	6.2
Over 50.....	82	56.1	40.2	20.7	137.8	86.6	31.7
NEW YORK MEN							
35-45.....	73	5.5	8.2	5.5	8.2	12.3	8.2
Over 50.....	38	13.2	15.8	7.9	15.8	15.8	7.9
NEW JERSEY MEN							
35-45.....	30	16.7	23.3	10.0	36.7	30.0	13.3
Over 50.....	18	33.3	27.8	16.7	72.2	44.4	16.7

The table reveals some interesting facts concerning the accident records of Connecticut drivers. A greater percentage of the drivers traveling at speeds above 50 miles per hour had been involved in accidents and, on an average, they had 58.7 percent more accidents per driver than drivers whose speeds were moderate (fig. 11).

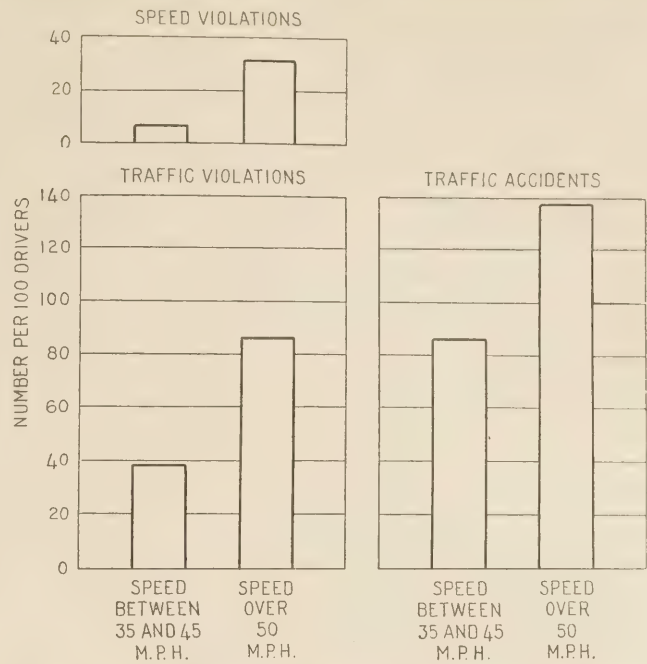


FIGURE 11.—COMPARISON OF NUMBER OF SPEED VIOLATIONS, TRAFFIC VIOLATIONS, AND TRAFFIC ACCIDENTS FOR MODERATE AND HIGH-SPEED CONNECTICUT DRIVERS INCLUDED IN STUDY.

Similar results are shown for drivers with New York and New Jersey registrations. The number of records available were few but, with this reservation, it may be pointed out that the difference in accident records for fast and moderate-speed drivers was even greater than was the case with Connecticut drivers. The percentage of the New York drivers going over 50 miles per hour having accident records was almost 2½ times as great as for the moderate-speed drivers, while the percentage for the New Jersey high-speed drivers was twice as great as for the moderate-speed drivers. In both cases the accidents per driver were nearly twice as high for the high-speed as for the moderate-speed drivers.

The data in table 24 include speed violations as well as all other types of traffic violations. In Connecticut the high-speed group accounted for more than twice as many violations per driver as the moderate-speed group. Less marked differences appeared for New York and New Jersey operators.

The high-speed group in Connecticut had four times as high a percentage of speed violators as the moderate-speed group. On an average, each high-speed driver participated in five times as many speed violations as each driver in the moderate-speed group. Similar but less marked differences are noted for New York and New Jersey operators.

A comparison of the accident records of high- and moderate-speed Connecticut women drivers showed that 23 percent of the high-speed group had at least one traffic accident as against 20 percent for the moderate-speed group. The high-speed group averaged 46.2 accidents per hundred drivers as against 27.2 for the low-speed group. By comparing these figures with those for the men (table 24), it may be seen that both groups of women drivers averaged only one-third as many accidents per driver as the men. One reason for this large difference is that the average woman has not been exposed to traffic accidents as much as the average man, since her present annual travel is only about half as great and her total travel during the years that

accident records were available was probably less than half the total travel of the average man.

A comparison of the average speeds of owners and nonowners of different ages (table 6) shows that young nonowners traveled faster than owners and that a great majority of young operators did not own the cars they were driving. These findings are especially significant in view of the fact that young people have a very high accident rate.

Not only did young people have more accidents than older people in proportion to the number driving but, according to the following tabulation, nonowners also had more than their share of accidents. Significant data pertaining to nonowner drivers are contained in the following tabulation:

	<i>Percent- age of drivers that were nonowners</i>
Fatal accidents in Connecticut (1927-36)	51.3
All accidents in Connecticut (1927-36)	43.5
Drivers licensed in Connecticut (1927-36)	10.9
Drivers in speed study (1939)	31.2

¹ Estimated.

NONOWNERS, SINGLE MEN, AND DRIVERS OF NEW CARS PREDOMINATE HIGH-ACCIDENT GROUP

Nonowner drivers were involved in over half of the fatal accidents in Connecticut between 1927 and 1936 and in nearly half of all the accident reported. The proportion of owner and nonowner drivers in the Connecticut driving population has not been determined, so an estimate of the percentage of nonowners was based on the total number of licensed drivers and registered vehicles. Over the 10-year period, Connecticut had 89.1 percent as many registered cars as licensed drivers. If this figure represents the percentage of owners, nonowners had a much larger percentage of the accidents than they should have had in proportion to their number. The percentage of nonowners as obtained by this speed study is not so far from the figure for the percentage of accidents involving nonowners. Thus, there is an indication that nonowners have a higher accident rate than owners.

If these findings about vehicle ownership are verified for larger samples of the driving population, they will be useful in attempts to reduce the accident rate.

Of the Connecticut drivers included in this study there were 64 foreign-born men and 325 native-born men whose accident records were available. Fifty of the foreign-born men and 259 of the native-born men had been involved in accidents. The drivers with accidents constituted practically the same percentage of each group. However, the accident rate per mile driven was slightly higher for the foreign-born men, since their annual travel was only 84.8 percent of the annual travel for native-born men (table 19).

Practically the same percentage of single men as married men had been involved in traffic accidents. On the basis of mileage traveled, the accident rate was 10 percent lower for the married men.

Table 25 shows that the percentage of Connecticut registered vehicles involved in accidents during the first 6 months of 1939 was higher for new cars than for old cars. The new cars were involved in more accidents, were driven farther and at higher speeds, than were the older cars. Although many other factors are involved, the lower speed at which older cars are driven is probably a very significant factor in explaining the lower accident rate.

TABLE 25.—Percentage of registered vehicles involved in accidents, average speed, and average annual travel for vehicles of different year models

Model of vehicle	Connecticut registered vehicles involved in accidents ¹	Speed ²	Approximate annual travel ³
	Percent	M. p. h.	Miles
1929 and older	1.3	38.7	12,400
1930-31	1.3	39.3	14,600
1932-33	2.0	39.7	15,000
1934-35	2.5	42.0	17,500
1936-37	3.3	42.9	18,500
1938-39	3.2	44.0	22,600

¹ From Connecticut Motor Vehicle Department report Cars of Yesteryears. The figures on registered vehicles used in obtaining these percentages include transfers of registrations. Since a higher proportion of older automobiles are transferred than newer ones, the number of older model cars is higher than it should be. A careful check of the actual number of vehicles in use during a particular year will probably reveal that old-model vehicles show a higher accident rate than is indicated here.

² From table 14. Data for Connecticut men and women.

³ Data only for Connecticut men who own cars.

There are a number of variables not covered by this study that may influence the speed of traffic. Since this investigation was conducted for the specific purpose of studying the effect on speed of factors relating to the driver, all other variables were eliminated, to as large an extent as possible, by the selection of locations and hours of study. Some of the other variables are:

1. Type, condition, and width of road surface.
2. Sight distance and highway alinement.
3. Type and density of traffic.
4. Diurnal, weekly, and seasonal changes.
5. Weather and temperature.
6. Speed regulations.
7. Regional differences.

Data necessary for a complete study of the effect of most of these variables are being obtained in connection with extensive highway-capacity and passing-practice studies being conducted by the Public Roads Administration. However, to obtain a complete picture of the characteristics of each group of drivers, it is essential that future speed studies of this nature include locations where driving conditions are not ideal. One particular group of drivers may travel at moderate speeds under ideal conditions but fail to exercise the same relative degree of caution under less favorable circumstances.

SUMMARY

The findings of this investigation are necessarily qualified by the conditions of this survey and must be considered as specifically pertinent only to drivers represented by the sample obtained. They are:

1. Out-of-state motorists drove newer cars, carried more passengers, and traveled faster than Connecticut drivers.
2. Young persons drove faster than older persons.
3. Nonowners, especially the younger persons, drove slightly faster than owners.
4. Women drove nearly as fast as men.
5. Drivers on long trips traveled faster than drivers on short trips.
6. Lone drivers and drivers with passengers to whom they were not related drove faster than drivers with passengers related to them.
7. Newer vehicles were driven faster than older vehicles.
8. Drivers who traveled faster than 50 miles per hour had been involved in more accidents, traffic

violations, and speeding violations than drivers who traveled between 35 and 45 miles per hour.

Other points which the study indicates for this sample of drivers are:

1. Men drove nearly twice as far each year, were not accompanied by as many passengers, and had been involved in more accidents than women.

2. Women drivers under 25 years of age had had as many years driving experience as men of the same age, but older women had had considerably less driving experience than men of the same age.

3. Newer vehicles were driven more miles each year and were involved in more accidents than older cars.

4. Drivers between 40 and 50 years of age owned a relatively large proportion of the new cars and had as many years of driving experience as men in the older age brackets.

5. Men between 30 and 50 years of age traveled more miles each year than either younger or older drivers.

6. The annual travel for the men with less than 2 years of driving experience was relatively low, but increased progressively up to 5 years of experience.

7. The majority of older drivers operated old cars.

8. Vehicles approaching a city traveled faster than vehicles that had recently left a city.

COMPILATION OF HIGHWAY RESEARCH ACTIVITIES AVAILABLE

The Highway Research Board has announced the publication of a compilation of the highway research activities of some 85 organizations, which include Federal Government agencies, State Highway Departments, colleges and universities, commercial laboratories, and trade associations. Entitled "Highway Research, 1920-1940," its preparation was a joint undertaking by the Committee on Research Activities of the American Association of State Highway Officials. F. V. Reagel, Chairman, and the Highway Research Board, R. W. Crum, Director.

The book contains sections on Highway Planning

Survey, Economics and Finance, Design, Materials, Construction, Maintenance, Traffic, and Soils Investigations. Each section is further subdivided to classify the material in convenient form for reference. There are approximately 1,500 titles of research projects, together with the name of the agency reporting the investigation, a brief statement of the scope of the work, and its present status.

The book, paper-bound, is priced at \$1.00 per copy and may be purchased from the Highway Research Board, 2101 Constitution Avenue, N. W., Washington, D. C.

STATUS OF FEDERAL-AID HIGHWAY PROJECTS

AS OF JUNE 30, 1940

STATE	COMPLETED DURING CURRENT FISCAL YEAR			UNDER CONSTRUCTION			APPROVED FOR CONSTRUCTION			BALANCE OF FUNDS AVAILABLE - GRANTED PROJ-ECTS		
	Estimated Total Cost	Federal Aid	Miles	Estimated Total Cost	Federal Aid	Miles	Estimated Total Cost	Federal Aid	Miles	Estimated Total Cost	Federal Aid	Miles
Alabama	7,983,896	3,863,858	307.5	5,383,951	2,676,140	174.2	1,577,050	785,270	57.8	1,577,050	785,270	57.8
Arizona	2,856,253	1,991,768	150.7	1,125,844	744,693	47.7	341,609	1,155,995	15.2	341,609	1,155,995	15.2
Arkansas	5,275,011	4,153,122	236.8	2,393,379	1,213,226	115.9	701,625	345,671	34.0	701,625	345,671	34.0
California	6,178,220	3,266,446	107.0	8,018,617	4,158,986	122.8	3,248,310	1,711,300	59.7	3,248,310	1,711,300	59.7
Colorado	4,346,845	2,327,858	99.8	1,968,214	1,089,755	49.3	719,262	405,376	42.1	719,262	405,376	42.1
Connecticut	1,353,854	671,370	16.1	1,917,578	936,280	15.3	758,738	393,977	6.1	758,738	393,977	6.1
Delaware	951,458	455,106	31.5	1,277,655	638,504	11.3	800,394	423,082	21.3	800,394	423,082	21.3
Florida	3,640,769	1,817,537	41.7	3,707,680	1,843,561	114.7	786,872	393,436	11.4	786,872	393,436	11.4
Georgia	5,470,047	2,620,915	277.2	5,509,149	2,754,574	286.0	5,447,520	2,724,260	190.7	5,447,520	2,724,260	190.7
Illaho	10,511,990	5,151,537	228.5	1,066,142	652,672	67.1	564,127	294,707	83.6	564,127	294,707	83.6
Illinois	2,436,176	1,429,520	147.9	8,347,898	4,173,784	176.0	1,966,300	982,420	49.2	1,966,300	982,420	49.2
Indiana	4,756,066	2,290,863	93.7	7,220,581	3,603,884	150.7	1,720,904	860,400	23.8	1,720,904	860,400	23.8
Iowa	4,871,246	2,294,632	229.4	4,572,482	2,098,627	113.8	3,070,418	1,443,950	106.8	3,070,418	1,443,950	106.8
Kansas	4,446,514	2,152,020	244.2	4,629,183	2,280,577	257.6	4,684,483	2,325,736	314.8	4,684,483	2,325,736	314.8
Kentucky	4,057,997	2,005,897	130.6	3,863,166	1,930,027	76.5	1,452,267	726,133	66.1	1,452,267	726,133	66.1
Louisiana	1,748,247	870,857	54.0	11,834,155	2,960,476	37.3	2,576,521	1,276,640	60.0	2,576,521	1,276,640	60.0
Maryland	2,946,809	1,410,105	39.5	971,947	485,973	19.8	935,236	467,618	24.8	935,236	467,618	24.8
Massachusetts	3,192,338	1,573,441	69.0	2,468,276	1,152,820	42.2	1,969,258	971,529	11.6	1,969,258	971,529	11.6
Michigan	5,365,187	2,577,444	128.0	2,017,840	1,005,372	17.4	2,425,928	1,207,014	17.4	2,425,928	1,207,014	17.4
Minnesota	5,947,894	2,914,353	389.7	7,436,205	3,635,101	220.9	3,362,060	1,681,030	105.0	3,362,060	1,681,030	105.0
Mississippi	6,548,179	2,332,989	274.5	5,137,334	2,550,825	333.2	3,150,074	1,571,754	221.8	3,150,074	1,571,754	221.8
Montana	4,573,116	2,259,656	181.0	6,158,478	2,683,845	294.5	1,443,960	633,680	77.1	1,443,960	633,680	77.1
Nebraska	3,876,387	2,188,757	237.0	5,509,698	2,717,661	203.6	4,631,506	1,810,176	108.0	4,631,506	1,810,176	108.0
Nevada	5,418,390	2,587,274	468.7	5,542,441	2,667,672	614.9	1,024,134	578,103	54.5	1,024,134	578,103	54.5
New Hampshire	1,200,855	1,009,489	57.8	1,524,039	1,312,373	74.5	758,586	660,977	29.3	758,586	660,977	29.3
New Jersey	1,036,250	508,948	29.7	1,317,360	648,274	34.5	543,604	206,060	10.8	543,604	206,060	10.8
New Mexico	1,754,260	865,896	15.5	5,505,948	2,752,744	41.8	172,620	86,310	3.3	172,620	86,310	3.3
New York	2,631,111	1,600,580	211.4	1,805,829	1,114,077	107.0	544,640	328,309	46.6	544,640	328,309	46.6
North Carolina	9,981,172	4,791,056	187.1	4,523,741	2,404,617	267.5	3,303,207	1,422,109	41.4	3,303,207	1,422,109	41.4
North Dakota	6,150,140	3,059,170	361.5	5,609,971	2,804,617	267.5	710,120	355,060	35.3	710,120	355,060	35.3
Ohio	391,472	207,911	50.5	2,841,088	1,602,169	116.9	3,965,704	2,043,326	353.3	3,965,704	2,043,326	353.3
Oklahoma	7,599,042	3,715,068	86.7	10,946,455	5,449,793	107.3	5,299,650	2,648,915	44.4	5,299,650	2,648,915	44.4
Oregon	3,932,851	2,082,955	167.0	2,912,740	1,543,221	74.6	2,678,740	1,365,321	133.8	2,678,740	1,365,321	133.8
Pennsylvania	3,449,128	2,065,015	123.8	3,627,295	2,176,497	152.8	512,491	305,363	12.0	512,491	305,363	12.0
Rhode Island	10,756,517	5,145,525	116.8	10,320,863	5,113,518	122.6	4,650,292	2,300,876	32.4	4,650,292	2,300,876	32.4
South Carolina	692,884	335,467	8.1	1,219,366	608,715	11.5	529,396	264,335	6.0	529,396	264,335	6.0
South Dakota	2,768,900	1,242,108	86.6	2,287,133	1,099,668	131.0	1,042,603	429,440	127.7	1,042,603	429,440	127.7
Tennessee	3,560,226	1,937,860	352.4	3,756,790	2,182,850	476.9	2,065,890	1,102,260	338.0	2,065,890	1,102,260	338.0
Texas	16,464,303	8,092,087	116.3	3,241,914	1,620,957	83.8	1,278,090	639,045	51.6	1,278,090	639,045	51.6
Utah	2,678,494	1,867,809	128.3	824,265	603,248	56.2	1,584,930	780,460	80.6	1,584,930	780,460	80.6
Vermont	741,568	350,426	18.4	1,331,658	665,807	40.9	517,087	257,547	10.9	517,087	257,547	10.9
Virginia	2,942,471	1,452,451	89.3	2,921,061	1,401,182	70.0	708,441	322,207	22.7	708,441	322,207	22.7
Washington	2,745,647	1,416,480	41.2	4,044,338	2,132,929	75.2	658,965	342,600	18.3	658,965	342,600	18.3
West Virginia	2,443,858	1,269,384	58.3	2,175,000	1,080,285	54.6	2,103,290	1,051,391	74.7	2,103,290	1,051,391	74.7
Wisconsin	5,150,897	2,525,683	187.6	5,215,376	2,560,898	161.9	1,569,103	749,535	84.7	1,569,103	749,535	84.7
Wyoming	1,934,233	1,189,596	200.2	1,579,651	1,004,436	147.8	395,537	252,822	67.4	395,537	252,822	67.4
District of Columbia	768,480	351,590	5.5	211,524	105,762	2.2	435,300	181,538	3.3	435,300	181,538	3.3
Puerto Rico	1,099,288	504,401	15.9	238,350	121,912	2.8	686,141	341,216	11.6	686,141	341,216	11.6
TOTALS	209,863,586	106,892,922	7,799.1	212,026,058	104,659,298	7,084.8	89,122,021	44,307,171	3,709.0	89,122,021	44,307,171	3,709.0

STATUS OF FEDERAL-AID SECONDARY OR FEEDER ROAD PROJECTS
AS OF JUNE 30, 1940

STATE	COMPLETED DURING CURRENT FISCAL YEAR			UNDER CONSTRUCTION			APPROVED FOR CONSTRUCTION			BALANCE OF FEDERAL-AID AVAILABLE FOR PROGRAMMED PROJECTS
	Estimated Total Cost	Federal Aid	Miles	Estimated Total Cost	Federal Aid	Miles	Estimated Total Cost	Federal Aid	Miles	
Alabama	\$ 1,092,869	\$ 436,439	48.3	\$ 890,192	\$ 443,270	46.4	\$ 239,920	\$ 119,950	11.3	\$ 538,292
Arizona	417,901	298,324	51.8	105,397	55,108	10.5	139,904	101,010	.8	299,840
Arkansas	1,017,413	854,162	88.3	107,875	64,061	11.2	223,123	111,356	22.4	242,552
California	956,655	515,699	44.8	651,515	354,581	24.9	411,897	222,172	17.1	839,479
Colorado	1,132,362	568,158	31.9	54,923	8,092	.6	159,597	89,949	1.3	192,177
Connecticut	172,310	72,417	2.9	367,826	178,009	4.6				206,069
Delaware	84,115	39,067	11.5	59,537	34,768	7.8	98,995	41,350	7.7	266,125
Florida	904,133	443,690	31.3	29,916	14,998	.6	365,957	182,979	6.8	425,456
Georgia	363,706	172,132	44.2	468,089	234,045	57.3	498,287	234,143	28.2	1,131,926
I Idaho	581,376	322,698	51.9	4,503	2,752		84,690	51,169	16.6	244,207
Illinois	1,667,905	747,611	103.2	1,758,985	862,318	73.3	513,400	256,067	13.2	408,283
Indiana	896,572	423,398	71.7	1,409,170	203,361	29.1	161,406	80,600	8.1	945,980
Iowa	1,048,264	500,412	222.8	1,406,733	669,575	255.4	937,574	442,760	196.2	447,293
Kansas	278,389	139,178	48.6	498,460	252,139	7.5	551,712	275,856	64.7	1,303,039
Kentucky	1,384,299	401,514	95.6	533,852	200,130	41.4	631,506	180,700	46.5	339,278
Louisiana	923,473	445,833	79.6	297,929	148,910	25.7	168,450	79,067	9.3	453,400
Maine	470,613	223,934	26.5	116,974	57,698	6.4	62,000	31,000	4.9	31,214
Maryland	306,943	144,266	20.2	131,996	65,958	5.5				417,585
Massachusetts	373,212	185,203	9.2	540,478	267,607	13.1	112,640	56,320	3	486,733
Michigan	1,510,551	734,265	121.6	1,203,309	605,044	88.8	442,030	221,015	40.6	630,105
Minnesota	993,349	465,021	122.3	422,540	178,683	46.6	518,184	259,092	76.8	1,160,248
Mississippi	766,500	376,934	70.7	657,362	323,181	22.6	304,900	140,915	18.2	573,008
Missouri	1,124,147	554,417	169.8	548,630	274,315	55.4	291,700	118,619	53.2	767,826
Montana	1,024,043	574,247	95.5	445,129	251,761	54.1	280,366	158,210	28.7	641,509
Nebraska	1,131,239	529,803	222.9	527,521	263,601	76.2	458,592	229,296	63.6	297,846
Nevada	247,307	205,751	31.5	136,544	117,694	28.8	18,110	15,788	4.8	193,328
New Hampshire	113,324	55,299	4.3	85,641	40,146	2.2				197,644
New Jersey	335,458	174,500	12.2	559,540	279,770	18.3	31,230	15,495	1.3	524,785
New Mexico	469,280	287,227	42.1	367,851	229,448	26.9	150,797	72,336	.9	190,111
New York	1,966,117	946,407	95.0	2,169,035	1,049,440	69.0	691,100	263,450	14.2	395,619
North Carolina	1,053,159	520,851	109.5	981,563	491,748	85.9	139,080	67,804	12.5	328,477
North Dakota	114,601	59,497	8.2	62,121	34,895		149,983	80,390	3.8	1,014,688
Ohio	703,493	347,369	41.8	2,435,916	1,224,668	89.9	835,340	395,290	18.3	865,205
Oklahoma	531,016	276,162	36.1	581,706	308,724	43.8	361,180	166,526	16.5	924,501
Oregon	761,139	435,942	81.6	263,618	140,424	36.2	179,828	104,226	26.7	302,774
Pennsylvania	2,339,648	1,125,227	128.4	1,871,190	929,490	57.9	459,523	228,999	12.0	234,175
Rhode Island	93,827	46,890	2.2	230,054	115,001	3.6				95,049
South Carolina	589,454	235,287	56.9	651,540	250,828	61.0	177,519	74,850	56.4	227,521
South Dakota	27,371	15,025	4.1	3,624	3,624					1,260,313
Tennessee	956,289	420,211	32.3	114,396	57,198	7.9	29,896	14,948	3.0	1,006,149
Texas	2,896,756	1,425,706	328.9	1,151,693	562,936	153.3	338,958	149,175	42.2	1,122,102
Utah	340,753	200,505	46.7	6,700	5,000		187,609	98,500	19.3	153,707
Vermont	160,963	75,034	6.5	390,132	126,430	14.1	80,759	13,125	3.5	35,000
Washington	711,983	341,341	68.3	551,564	245,012	32.8	31,750	10,000	3.6	362,797
West Virginia	597,246	310,356	51.0	387,382	203,939	24.8	91,956	49,100	3.4	340,572
Wisconsin	234,628	115,713	13.1	283,919	141,434	15.4	102,508	51,254	5.7	446,849
Wyoming	997,327	495,708	36.7	525,424	262,350	7.2	340,406	167,870	20.4	686,667
District of Columbia	470,702	286,620	26.0	389,051	232,715	39.4	55,850	35,699	3.2	150,806
Hawaii	122,504	60,900	1.5	3,192	1,096		48,200	24,100	.6	60,154
Puerto Rico	193,032	96,211	6.2	278,748	139,878	8.7				157,036
	30,220	14,440	2.2	302,225	147,640	14.0	55,188	27,140	2.1	80,408
TOTALS	37,666,036	18,743,071	3,194.4	27,033,210	13,355,515	1,808.5	12,213,600	5,799,760	1,008.6	24,708,507

PUBLICATIONS of the PUBLIC ROADS ADMINISTRATION

Any of the following publications may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C. As his office is not connected with the Agency and as the Agency does not sell publications, please send no remittance to the Federal Works Agency.

ANNUAL REPORTS

- Report of the Chief of the Bureau of Public Roads, 1931. 10 cents.
Report of the Chief of the Bureau of Public Roads, 1933. 5 cents.
Report of the Chief of the Bureau of Public Roads, 1934. 10 cents.
Report of the Chief of the Bureau of Public Roads, 1935. 5 cents.
Report of the Chief of the Bureau of Public Roads, 1936. 10 cents.
Report of the Chief of the Bureau of Public Roads, 1937. 10 cents.
Report of the Chief of the Bureau of Public Roads, 1938. 10 cents.
Report of the Chief of the Bureau of Public Roads, 1939. 10 cents.

HOUSE DOCUMENT NO. 462

- Part 1 . . . Nonuniformity of State Motor-Vehicle Traffic Laws. 15 cents.
Part 2 . . . Skilled Investigation at the Scene of the Accident Needed to Develop Causes. 10 cents.
Part 3 . . . Inadequacy of State Motor-Vehicle Accident Reporting. 10 cents.
Part 4 . . . Official Inspection of Vehicles. 10 cents.
Part 5 . . . Case Histories of Fatal Highway Accidents. 10 cents.
Part 6 . . . The Accident-Prone Driver. 10 cents.

MISCELLANEOUS PUBLICATIONS

- No. 76MP . . The Results of Physical Tests of Road-Building Rock. 25 cents.
No. 191MP . . Roadside Improvement. 10 cents.
No. 272MP . . Construction of Private Driveways. 10 cents.
No. 279MP . . Bibliography on Highway Lighting. 5 cents.
Highway Accidents. 10 cents.
The Taxation of Motor Vehicles in 1932. 35 cents.
Guides to Traffic Safety. 10 cents.
An Economic and Statistical Analysis of Highway-Construction Expenditures. 15 cents.
Highway Bond Calculations. 10 cents.
Transition Curves for Highways. 60 cents.
Highways of History. 25 cents.

DEPARTMENT BULLETINS

- No. 1279D . . Rural Highway Mileage, Income, and Expenditures, 1921 and 1922. 15 cents.
No. 1486D . . Highway Bridge Location. 15 cents.

TECHNICAL BULLETINS

- No. 55T . . . Highway Bridge Surveys. 20 cents.
No. 265T . . . Electrical Equipment on Movable Bridges. 35 cents.

Single copies of the following publications may be obtained from the Public Roads Administration upon request. They cannot be purchased from the Superintendent of Documents.

MISCELLANEOUS PUBLICATIONS

- No. 296MP . . Bibliography on Highway Safety.
House Document No. 272 . . . Toll Roads and Free Roads. Indexes to PUBLIC ROADS, volumes 6-8 and 10-19, inclusive.

SEPARATE REPRINT FROM THE YEARBOOK

- No. 1036Y . . Road Work on Farm Outlets Needs Skill and Right Equipment.

TRANSPORTATION SURVEY REPORTS

- Report of a Survey of Transportation on the State Highway System of Ohio (1927).
Report of a Survey of Transportation on the State Highways of Vermont (1927).
Report of a Survey of Transportation on the State Highways of New Hampshire (1927).
Report of a Plan of Highway Improvement in the Regional Area of Cleveland, Ohio (1928).
Report of a Survey of Transportation on the State Highways of Pennsylvania (1928).
Report of a Survey of Traffic on the Federal-Aid Highway Systems of Eleven Western States (1930).

UNIFORM VEHICLE CODE

- Act I.—Uniform Motor Vehicle Administration, Registration, Certificate of Title, and Antitheft Act.
Act II.—Uniform Motor Vehicle Operators' and Chauffeurs' License Act.
Act III.—Uniform Motor Vehicle Civil Liability Act.
Act IV.—Uniform Motor Vehicle Safety Responsibility Act.
Act V.—Uniform Act Regulating Traffic on Highways.
Model Traffic Ordinances.

A complete list of the publications of the Public Roads Administration, classified according to subject and including the more important articles in PUBLIC ROADS, may be obtained upon request addressed to Public Roads Administration, Willard Bldg., Washington, D. C.

STATUS OF FEDERAL-AID GRADE CROSSING PROJECTS

AS OF JUNE 30, 1940

STATE	COMPLETED DURING CURRENT FISCAL YEAR				UNDER CONSTRUCTION				APPROVED FOR CONSTRUCTION				BALANCE OF FUNDS AVAILABLE FOR OTHER PROJECTS
	Estimated Total Cost	Federal Aid	NUMBER		Estimated Total Cost	Federal Aid	NUMBER		Estimated Total Cost	Federal Aid	NUMBER		
			Grade Eliminated by Separate Re-locations	Grade Completed (Streets, Sidewalks, etc.)			Grade Eliminated by Separate Re-locations	Grade Completed (Streets, Sidewalks, etc.)			Grade Eliminated by Separate Re-locations	Grade Completed (Streets, Sidewalks, etc.)	
Alabama	\$ 1,051,467	\$ 1,047,240	14	2	\$ 766,310	\$ 766,227	6	6	\$ 18,400	\$ 18,400	1	5	\$ 864,506
Arizona	317,016	316,972	1	1	201,045	198,841	3	1	2,930	2,930	4	9	397,816
Arkansas	184,930	184,741	3	4	1,004,709	1,000,672	6	1	214,516	214,516	4	9	589,253
California	1,679,436	1,670,290	11	3	1,057,831	879,350	5	1	22,524	22,524	3	10	1,687,052
Colorado	658,131	626,888	6	25	277,100	277,100	1	1	3,401	3,401	1	1	922,522
Connecticut	47,558	33,998	7	7	619,053	608,861	5	1	157,294	157,294	2	1	453,560
Delaware	7,839	7,839	2	2	59,822	59,822	11	11	129,767	129,767	1	6	479,112
Florida	428,094	428,094	8	1	196,653	192,154	2	4	134,380	134,380	2	11	1,328,581
Georgia	355,730	346,957	4	7	567,440	567,440	9	4	729,419	729,419	6	13	1,955,303
Idaho	312,690	280,535	4	2	204,098	200,668	5	4	74,256	74,256	2	29	439,510
Illinois	2,610,426	2,471,622	16	5	2,199,248	2,055,105	11	1	679,912	515,170	1	80	2,205,709
Indiana	871,744	855,554	3	103	814,808	814,808	5	2	85,049	85,049	3	33	1,305,684
Iowa	1,242,286	1,170,981	14	197	315,885	262,288	3	30	328,616	289,659	3	64	1,201,126
Kansas	1,001,808	993,871	12	13	874,993	874,515	12	1	105,445	105,445	2	12	1,172,339
Kentucky	696,970	686,291	6	16	1,061,316	1,061,316	11	1	110,453	110,453	2	10	606,126
Louisiana	513,674	513,661	6	2	440,619	387,123	3	1	143,637	143,637	3	1	789,393
Maine	415,253	412,716	4	2	143,637	143,637	3	1	163,120	163,120	11	5	254,878
Maryland	128,896	119,788	1	14	608,009	576,216	3	1	35,300	32,900	1	2	798,625
Massachusetts	491,527	490,263	4	2	352,301	341,878	1	7	463,134	463,134	4	3	2,025,042
Michigan	885,083	864,284	6	4	1,723,506	1,723,506	9	3	336,218	336,218	4	3	951,409
Minnesota	521,669	495,669	4	17	1,836,120	1,835,026	12	3	463,134	463,134	3	13	1,047,107
Mississippi	584,354	584,354	8	1	1,336,219	1,336,219	4	1	76,200	76,200	3	1	913,824
Missouri	297,868	295,868	5	1	1,220,907	1,220,907	6	3	1,319,348	1,319,348	3	2	1,521,518
Montana	851,419	843,820	9	2	266,174	266,174	2	2	178,767	178,767	3	4	433,920
Nebaska	970,081	966,187	22	43	730,583	730,583	6	6	18,258	18,258	4	25	749,771
Nevada	204,930	200,602	1	3	46,041	46,041	6	2	47,978	47,978	1	175,016	175,016
New Hampshire	102,433	101,921	7	1	181,248	181,248	4	4	515,107	515,107	3	3	392,776
New Jersey	707,902	707,902	2	3	298,739	298,739	2	2	20,902	20,902	3	6	1,240,283
New Mexico	123,381	122,378	3	1	230,045	230,045	2	15	20,902	20,902	2	8	645,923
New York	1,906,664	1,872,132	5	8	3,517,642	3,456,247	12	12	399,165	399,165	2	2	3,341,430
North Carolina	1,303,572	1,267,940	7	5	861,683	861,683	11	3	243,740	243,740	2	12	947,316
North Dakota	923,514	481,087	7	1	486,560	486,560	7	4	56,190	56,190	15	12	780,868
Ohio	545,780	530,780	6	1	2,772,313	2,701,361	14	3	54,390	54,390	12	15	3,026,039
Oklahoma	439,951	436,211	6	50	466,327	466,327	4	1	527,498	527,498	9	45	1,937,141
Oregon	304,186	301,184	3	3	219,579	219,579	3	3	685,751	685,751	5	1	553,304
Pennsylvania	1,675,971	1,465,072	2	3	1,475,807	1,466,331	14	1	515,107	515,107	5	1	4,736,810
Rhode Island	447,437	446,798	1	3	194,789	194,789	1	1	89,410	89,410	2	1	1,070,979
South Carolina	566,584	533,060	7	7	427,918	427,918	5	2	118,450	118,450	2	4	1,215,007
South Dakota	228,512	212,772	3	2	164,272	163,412	3	1	159,275	159,275	1	1	1,753,235
Tennessee	664,545	650,142	2	5	209,862	209,862	1	2	796,366	796,366	8	1	2,249,732
Texas	2,728,231	2,690,719	25	3	1,477,131	1,405,323	12	12	15,472	15,472	1	8	345,738
Utah	394,979	394,694	3	140	50,171	50,171	13	13	685,751	685,751	5	5	4,736,810
Vermont	32,093	27,207	2	7	206,402	206,402	2	2	89,410	89,410	1	5	248,630
Virginia	819,836	726,883	9	3	212,501	211,955	3	2	97,068	96,848	1	5	1,198,319
Washington	418,877	417,401	5	2	353,819	352,319	4	1	17,614	17,614	2	6	579,742
West Virginia	390,641	374,681	9	2	3,910	3,910	4	1	113,000	113,000	1	2	1,253,132
Wisconsin	889,269	878,511	9	11	1,265,895	1,225,775	9	4	15,110	15,110	1	4	1,373,556
Wyoming	139,774	120,514	1	8	377,238	377,238	4	4	179,518	179,518	1	1	1,753,235
District of Columbia	317,500	317,500	1	1	8,868	8,868	1	1	48,000	48,000	1	2	152,203
Hawaii	198,156	195,526	4	1	194,036	194,036	2	1	9,494	9,494	1	2	289,821
Puerto Rico	49,040	48,840	1	1	584,007	579,336	11	11	9,494	9,494	1	2	414,857
TOTALS	33,757,112	32,731,071	305	72	34,168,796	33,240,144	259	63	10,217,611	9,320,179	80	20	55,457,505

